Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

EIM
a member of Panteia

SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
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All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

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Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

EIM
a member of Panteia

SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

EIM
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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

EIM
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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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Gender, risk aversion and remuneration policies of entrepreneurs

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Zoetermeer, December 21, 2010

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SCALES
SCientific AnaLysis of Entrepreneurship and SMEs

This research has been partly financed by SCALES, SCientific Analysis of Entrepreneurship and SMEs (www.entrepreneurship-sme.eu)

EIM Research Reports

reference number	H201105
publication	December 2010
number of pages	36
email address corresponding author	jko@eim.nl
address	EIM Bredewater 26 P.O. box 7001 2701 AA Zoetermeer The Netherlands Phone: +31(0)79 343 02 00

All the EIM research reports are available on the website www.entrepreneurship-sme.eu.

Contents

Summary

In theory, for many small and medium-sized enterprises the introduction of performance-related pay might be beneficial: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007), who explore determinants of performance-related pay amongst SMEs. Amongst others, they found support for the presence of gender effects; not only regarding the gender of the employees, but also regarding the gender of the entrepreneur.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies. These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. Generally speaking, women are more risk averse than men. This suggests that men and women have a different valuation of the risks that are associated with performance-related pay. We hypothesise that these different valuations will result in differences in the incidence of performance-related pay. This leads to the following five hypotheses:

- H1: Performance-related pay is less used for female employees than for male employees.
- H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs.
- H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees.
- H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees.
- H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing.

These hypotheses are tested by estimating various probit and OLS regressions, using the results of a telephonic questionnaire amongst 369 Dutch entrepreneurs with 1 - 100 employees.

At a significance level of 5%, we find partial support for hypothesis H1, but not for any of the other hypotheses. One explanation for these findings is that they indicate that employees are indeed risk averse (and men more than women) but that employers are not; hypothesis H1 is valid but H2 is not. In this case, hypotheses H3 and H4 are no longer valid, so the lack of support for hypotheses H3 and H4 is consistent with the lack of support for H2. The lack of support for the fifth hypothesis may be due to the limited size of our sample (approximately 120 valid observations were available to test this hypothesis).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. We use gender as a proxy for the risk aversion of individual employees, and assume that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be ar-

gued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

1 Introduction

Strong debate on performance-related pay

Until a few years ago, performance-related pay was becoming more and more accepted and used. This changed dramatically when Lehman Brothers went bankrupt in September 2008. In a reaction to the crisis that followed, many claimed that the practice of performance-related pay in especially the financial sector was one of the main causes for the current crisis. The debate on the advantages and disadvantages of performance-related pay (and how it should be designed) is still ongoing.

This debate tends to focus on large enterprises, where variable payment can account for a large share of total payment. The situation in small and medium-sized enterprises (SMEs) tends to be ignored in this discussion. For various reasons, this is not surprising. First of all, relatively little is known about payment systems in SMEs. In 2006, the Amsterdam Centre for Entrepreneurship (ACE) and EIM conducted a survey amongst 369 Dutch SMEs regarding their remuneration system. This is still one of the few surveys on this subject that includes SMEs. Secondly, the variable share of total payment tends to be relatively small in SMEs. Amongst others, the EIM - ACE survey included questions on the payment practices of the best-paid employee within each enterprise. The results indicate that, within the group of best-paid employees that received some form of performance-related pay, the variable share of their wage was on average 8% (De Kok et al., 2007).

Previous research: determinants of performance-related pay in SMEs

Van Praag et al. (2006) argue that many small and medium-sized enterprises might benefit from the introduction of performance-related pay: if implemented properly, it could help enterprises in selecting, hiring and motivating the right employees for the right jobs. So far, however, performance-related pay in SMEs has received little academic attention. One of the few studies on this topic is that by Roepers and De Kok (2007). Using the EIM - ACE survey, they explore determinants of performance-related pay amongst SMEs. In particular, they examined whether the incidence of performance-related pay for employees is related to the size and ownership structure of the enterprise and to the gender of the entrepreneur and the employees. Their results indicate that each of these variables is indeed related to the incidence of performance-related pay: larger firms are more likely to provide performance-related pay than smaller firms, and firms with a single owner and family firms are less likely to provide performance-related pay than firms with multiple owners (that are not related to each other). They also found a gender effect.

The gender effect that Roepers and De Kok (2007) found was, however, different from what they expected. They expected that both the gender of the entrepreneur and the gender composition of the workforce would affect the probability of performance-related pay, but that these two effects would be independent of each other. Instead, they found a close relationship between these two effects. For male entrepreneurs, they found that the use of performance-related pay is independent of the gender composition of the work force. For female entrepre-

neurs, however, they found that the usage of performance-related pay increases with the share of male employees.

Objective of the study

The role of the gender of the manager or (direct) supervisor on wages of subordinates has been considered before (Cohen and Huffman, 2007; Hultin and Szulkin, 2003). Likewise, the relationship between employee gender and performance-related pay has been studied before (Geddes and Heywood, 2003). However, as far as we know, the paper by Roepers and De Kok (2007) is the only paper that considers both the gender of the entrepreneur and the gender composition of the workforce.

In this paper we further investigate the gender effect in remuneration policies as found in Roepers and de Kok (2007). The central idea of this paper is that female and male entrepreneurs make different choices regarding their human resource management practices, including remuneration policies (Mukhtar, 2002; Verheul et al, 2002). These differences can be explained by differences in the risk aversion of male and female employees and entrepreneurs. We derive several hypotheses on how the interaction between the entrepreneurial gender and the gender composition of the workforce might affect the incidence of performance-related pay. These hypotheses are then tested, using the same dataset as Roepers and de Kok (2007).

Outline

In the next chapter we present the theoretical framework for this study and discuss the hypotheses that we will test. In chapter three we describe the data that we use to test these hypotheses. The results are presented in chapter four. As we will see, most of our hypotheses cannot be confirmed. Generally speaking, the available data does not support our ideas on how differences in risk aversion result in gender differences in the incidence of performance-related pay. Chapter five therefore starts with a discussion of possible explanations for our lack of positive results. After this discussion the main conclusions of our study are presented.

2 Theoretical framework and hypotheses

2.1 The general case for performance-related pay

An employment contract is an example of a relationship between a principal and an agent, where the principal delegates work to the agent. In such principal-agent relationships, two types of problems can occur, related to differences in goals and risk aversion between the agent and the principal. The first type of problem occurs when the principal and agent have different desires or goals and when it is difficult or expensive for the principal to monitor the agent's behaviour. This goal conflict introduces the risk of moral hazard: the risk that the agent may not provide the level of effort that was agreed upon. In this case, the agent is shirking. The second problem arises when the principal and the agent have different attitudes toward risk. The principal and the agent may prefer different actions while executing the work, because of their different risk preferences. (Eisenhardt, 1989).

These problems may be (partly) solved by using performance-related pay (for example, piece rate payment, commissions, bonuses or profit sharing) as a governance mechanism. If designed properly, including performance-related pay as part of the contract between the principal and the agent may prevent opportunistic agent behaviour. This will occur if the preferences of agents and principals are realigned in such a way that the rewards for both depend on the same actions. In such cases, the conflicts of self interest between principal and agent are reduced (Eisenhardt, 1989) and the agent is motivated to provide the efforts desired by the principal. In fact, one of the most important objectives of compensation is to provide proper and effective motivation to employees (Milgrom and Roberts, 1992).

Performance pay and firm size

In larger firms, shirking is less easy to detect. This increases the risk that shirking will actually occur (Chang, 2006). Larger firms therefore have more need for governance mechanisms to combat moral hazard and shirking. By using performance-related pay, firms can reduce the risk of shirking, because this removes (or reduces) the potential conflicts of self interest between employer and employees. The benefits of performance-related pay are therefore likely to increase with firm size. At the same time, the costs (per employee) of developing and maintaining performance-related pay system are likely to decrease with firm size: Larger firms have a larger demand for human resources, and therefore a larger demand for specific HRM practices. This stimulates standardization and formalization of these practices. Most formalized HRM practices require considerable development costs. This results in a cost advantage for larger firms, which is strengthened by the limited supply of financial resources of many small firms (De Kok, Uhlaner and Thurik, 2006).

These arguments suggest that the net benefits of performance-related pay will increase with firm size. This is consistent with the finding from previous research

that performance-related pay is more common amongst large firms than amongst SMEs (Van Praag et al., 2006).

Performance pay and risk aversion

The realignment of the agent's preferences with those of the principal often requires that certain risks are transferred from the principal to the agent (Eisenhardt, 1989). This is also the case with performance-related pay, where the risk of under-performance is shared between the principal and the agent. The extent to which this actually takes place depends on the actual levels of risk aversion of the relevant principal and agents. In agency theory it is often assumed that firms are risk neutral (e.g. because firms are owned by different investors with well-diversified portfolios) while individual employees are risk averse (Chang, 2006; Milgrom and Roberts, 1992). This creates a stimulus to provide a fixed wage to the risk-averse employees: by transferring most of the income risks of employees to the firm, the employees are better of while the firm is not affected. It is doubtful, however, whether this assumption also applies in the case of SMEs. For example, the idea that the firm is owned by different investors with well-diversified portfolios does not apply to the majority of SMEs. Often, SMEs are single owned-managed enterprises. In these cases, the level of risk aversion of the firm is basically determined by the risk aversion of the entrepreneur. This, in turn, may be related to the entrepreneurs' gender.

2.2 Gender differences in risk attitude: five hypotheses

It is well established that the risk attitude of individuals is partly related to their gender (Bajtelsmit and Bernasek, 1996; Borghans et al., 2009; Dohmen and Falk, 2001). It is however difficult to identify the causes of this gender difference: it is generally only possible to observe the outcomes of decisions, and not the decision-making processes themselves.

Borghans et al. (2009) use experiments to examine possible determinants of risk aversion. They find that risk aversion is partly determined by psychological traits such as the "big 5"[1]. Gender differences in these traits explain only a small part of gender differences in risk aversion. In the context of financial decisions, risk aversion is also related to wealth: in an absolute sense (the amount of money invested in risky assets), risk aversion decreases with wealth (Bajtelsmit and Bernasek, 1996). Since women have lower wages than men (both in general and for comparable positions), this suggests an indirect gender effect on risk aversion.

If female employees are more risk averse then male employees, they require a higher risk premium to accept performance-related pay. When comparing a fixed wage offer with a performance-related pay offer with a certain risk premium, female employees will be more likely to prefer the fixed wage offer. This is confirmed by an empirical study by Dohmen and Falk (2001). They find that women are more risk averse than men, and that this difference in risk preference ex-

[1] The big 5 represent the following five basic dimensions of personality: openness, conscientiousness, extraversion, agreeableness and neuroticism.

plains their attitude towards variable pay: 68% of the 119 male participants of their study prefer a variable pay, compared to 44% of the 121 women.
If female employees require a higher risk premium to accept performance-related pay, this reduces the expected benefits of performance-related pay for the entrepreneur. This, in turn, makes it less likely that performance-related pay will occur. Thus, we expect that the share of women in the workforce will have a negative effect on the probability that a firm will introduce performance-related pay.

The causality may also run in the opposite direction. If performance-related pay is actually introduced, this may stimulate the outflow of female employees. This will occur if the new wage offer (including both a variable and fixed part) is not high enough to cover the demanded risk premium. In addition, the presence of performance-related pay can stimulate the inflow of male applicants. Thus, the presence of performance-related pay can have a negative effect on the share of women in the workforce.

Irrespective of the direction of causality, these arguments suggest a negative correlation between the share of women in the workforce and the incidence of performance-related pay. This leads to our first hypothesis:

H1: Performance-related pay is less used for female employees than for male employees

The gender difference in risk aversion does not only apply to the population in general, but also to the population of entrepreneurs. Female entrepreneurs tend to be more risk averse than male entrepreneurs (ENSR 1996; Verheul and Thurik, 2001). This suggests that (ceteris paribus) female entrepreneurs are more likely to transfer some of the company risk onto their employees (Chang, 2006). This can be done by using performance-related pay. This results in the second hypothesis of this study:

H2: Female entrepreneurs are more likely to use performance-related pay than male entrepreneurs

This hypothesis is supported by gender differences in management style. Verheul (2003) has studied the gender effect of management styles in small firms in the Netherlands, and found that female entrepreneurs are more likely to use formal HRM practices than male entrepreneurs. She distinguishes between commitment and control oriented management. The higher the degree to which procedures and regulation are formalized, the higher the degree of control over employees and the production process is. She finds that female-led firms have a more control-oriented type of HRM than male-led firms. This result implies that female entrepreneurs can be associated with a higher degree of formalization. This is consistent with a higher usage of performance-related pay.

In contrast, Verheul, Risseeuw and Bartelse (2002) suggest that female entrepreneurs may be more inclined to use non-pecuniary rewards, such as flexibility of working hours, childcare facilities and verbal compliments, to motivate their employees. Their relatively high attention for non-pecuniary rewards would imply that female entrepreneurs would be less likely to use performance-related pay

than male entrepreneurs. However, they do not find significant support for the assumptions of less performance-related pay. Therefore the expectation remains that female entrepreneurs are more likely to use performance-related pay schemes.

The first hypothesis is related to the gender composition of the workforce, while the second hypothesis is related to the gender of the entrepreneur. We assume that these two effects work independently of each other. In that case, the combination of these hypotheses results in the following two additional hypotheses:

H3: Performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees

H4: Performance-related pay is least likely to occur in firms with a male entrepreneurs and a high share of female employees

As we noted before, it is often assumed that firms are risk neutral while individual employees are risk averse. If this is the case, we should find empirical support for hypothesis H1 but not for H2 (and therefore also not for H3 and H4). In addition, we expect to find support for another hypothesis, concerning the effect of performance-related pay on firm profits. Whether or not the usage of performance-related pay will have a positive effect on profits depends on many different factors. One of these factors is the risk premium that the entrepreneur has to offer to the employees, in order to make them accept the new system[1]. This risk premium is higher for female employees than for male employees. Hence, if the share of male employees is relatively high, the expected costs of using performance-related pay will be relatively low, making it more likely that performance-related pay will be beneficial to the overall profits of the firm. Conversely, if the share of female employees is relatively high, profits are likely to be higher using fixed wages (wages not related to performance) rather than performance-related pay. Formulated differently: we expect that pay policies that are consistent with efficient risk sharing vary with the gender composition of the workforce. If the share of female employees is low, efficient pay policies involve performance-related pay; if the share of female employees is high, efficient pay policies involve fixed wages only.

Our final hypothesis is that firms with an efficient pay policy as defined above will generate higher profits than firms with an inefficient pay policy. With small firms, it is often difficult to differentiate between the entrepreneur's income and the profit of the enterprise. This is especially the case if the enterprise has the legal form of a sole proprietorship: in this case, the entrepreneur cannot receive a wage, so the entrepreneurial income is part of the generated profits. We therefore formulate this hypothesis in terms of entrepreneurial income rather than profit. This results in the following hypothesis:

H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk sharing

[1] Often, the entrepreneur of an SME may have the authority to introduce and use a performance-related pay system without employee approval. Nevertheless, if the entrepreneur wants to retain valuable employees and keep them motivated, it is important that the employees feel that they are compensated for the financial risk that comes with performance-related pay.

3 Research methodology

3.1 Questionnaire and sampling framework

The dataset that we use for this study has previously been used by De Kok et al. (2007) and Roepers and de Kok (2007). In this section we give a brief description of the questionnaire and the sampling framework. More details can be found in De Kok et al. (2007).

3.1.1 Questionnaire

The questionnaire was developed by De Kok et al. (2007) based on prior knowledge, in-house expertise and existing questionnaires. The concept questionnaire was tested through several pilot interviews. This resulted in a few adjustments in the formulation of the survey questions. The final survey focuses on the remuneration of the entrepreneur and the best-paid employee. In addition, the questionnaire also contains questions regarding structural and personal characteristics of the firm and its employees.

3.1.2 Sample

The data has been gathered through a telephone survey in June and July 2006. The sample is stratified by size (varying from one to 100 employees on the payroll), sector and age, and consists of 369 Dutch SMEs. Table 1 shows the distribution of the sample by size and age. The questions in the survey were answered by the independent entrepreneurs (in case of a single owned firm), the major business partner (in case of a partnership), or by the general director (in other legal structures).

Table 1 Sampled firms, by reported firm size and firm age

	*Age category**			
Number of employees	*0 - 3 years*	*4 - 9 years*	*>= 10 years*	*Total*
1	8	13	7	28
2 - 9	18	42	69	129
10 - 49	11	27	80	118
50 - 99	15	16	63	94
Total	52	98	219	369

** After imputing missing values for 28 observations.*

Source: EIM and ACE.

3.2 Dependent variables

The first four hypotheses concern the usage of performance-related pay within small and medium-sized enterprises. Our data set allows us to use two different indicators of performance-related pay by employees: a specific indicator concerning performance-related pay for the best-paid employee in the firm, and an indicator concerning the application of performance-related pay for employees in

general. The fifth hypothesis concerns the entrepreneurial income, for which we use a single measure. In this section we describe the three dependent variables that are used in our study.

Use of performance-related pay for the best-paid employee

The remuneration of employees can consist of various components. To determine the composition of the remuneration of the best-paid employee, we asked which of the following components were actually received by the best-paid employee during 2005:

- fixed wage;
- profit sharing;
- bonus;
- options (only in case of a limited liability company);
- company car, phone or computer.

Since it is not clear if the usage of a company car, phone or computer is related to the performance of the employee, we do not include these remuneration components in our measurement for performance-related pay for the best-paid employee. We also decided not to use information on the usage of options, since this was mentioned by only three respondents. The resulting indicator for performance-related pay for the best-paid employee thus indicates whether the best-paid employee received a share of the profit or a bonus during 2005. This is the case for 32% of our observations.

Use of performance-related pay for some or all employees

The questionnaire includes a single question on performance-based pay for the workforce as a whole, asking whether or not the enterprise makes use of performance-related pay for some or all of its employees. This is the case for 34% of our observations.

There is a reasonable overlap with the indicator of performance-related pay for the best-paid employee, but it is not very strong. About a third of all enterprises that use performance-related pay for at least some employees indicate that their best-paid employee did not receive a share of the profits or a bonus. What is more problematic is that about a third of the enterprises that reported that their best-paid employee received a bonus or participated in profit sharing, answered 'no' to the question whether at least some of their employees received any performance-related pay. If both indicators would indicate the same type of payment systems, this would not be possible. Presumably, the difference in the wording of the questions resulted in a different interpretation by the respondent of the specific remuneration components that should be taken into consideration.

Entrepreneurial income

The annual income of an entrepreneur can also include various components, where the choice for specific components depends (amongst others) on fiscal legislation and the legal structure of the enterprise. For example, in the Netherlands entrepreneurs can only receive a wage if their enterprise is organised as a limited liability company, not in case of a sole proprietorship.

In the questionnaire, we asked whether the entrepreneur received any of the following income components (and, if so, the level of that component):

- fixed wage (including management fee in case of a limited liability company);
- profit sharing. In case of a sole proprietorship or partnership, we first asked if the respondent would indicate the profit level; we then asked which part of this profit was used for private means. In case of a limited liability company we directly asked for the amount of profit received by the respondent;
- bonus;
- shares (only in case of a limited liability company);
- options (only in case of a limited liability company).

Of these income components, shares and options were the least common. This is partly due to the fact that these components can only occur in the case of a limited liability company. However, also within this subset of enterprises shares and options do not occur often: 27 respondents received shares as part of their income, 7 respondents received options, and only 3 respondents could indicate the value of the received shares or options. We therefore decided to exclude shares and options from our definition of entrepreneurial income. Hence, we define entrepreneurial income as the sum of the received wage, profit sharing or bonuses for 2005.

Information on the entrepreneurial income is available for 170 respondents. Of these respondents, 25 reported an income equal to zero, another three respondents reported a total annual income of less than € 10 000,-. At the other end of the distribution, three entrepreneurs reported an annual income ranging from € 400 000 to € 700 000. Summary statistics are reported in Table 2. These statistics show a large gender effect. This will be explored further in the next chapter.

Table 2 Summary statistics: entrepreneurial income by gender of the entrepreneur

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
Income level entrepreneur (x € 1.000):			
male entrepreneurs	77.8	97.2	155
female entrepreneurs	32.8	50.2	15
all entrepreneurs	73.9	94.8	170

Source: EIM and ACE

Notes: 1) income is defined as the sum of wages, profit shares, bonuses or gratuities;
2) "entrepreneur" refers to the respondent of the questionnaire. This is the CEO or general manager of the firm.

3.3 Independent variables

Characteristics of the firm

Relevant firm characteristics include sector, firm size and firm age. Sector is represented by a standard classification into eight different sectors (manufacturing; construction; automotive; wholesale; retail; transport and communication; hotels

and restaurants; services) and firm size is represented by the number of employees of the firm.

Regarding firm age, our dataset allows us to differentiate between the legal age and the economic age of the organisations. The legal age is the age of the current legal form of the organisation. This is the age that is registered at e.g. the Chamber of Commerce. An organisation's economic age indicates how long the firm has been economically active. De Kok et al. (2007) show that the legal and economic age of firms often differ, in which case the economic age generally exceeds the legal age. A possible explanation for this might be that the legal structure of the organisation has changed over time. In this study we control for possible age effects by including the logarithm of the economic age[1]. Not all firms provided information regarding their age. For 39 firms, missing values were imputed.

Some studies report a strong correlation between firm size and firm age (e.g. Heyman, 2007). This could make it difficult to distinguish between size and age effects. To check whether this is also the case in our sample, we examined the correlation between economical age and number of employees. This correlation is 0.07; if we exclude firms of 75 years or more, the correlation increases somewhat, but is still only 0.15. We therefore conclude that there is no risk that effects of firm size and firm age cannot be distinguished from each other.

Characteristics of the entrepreneur

Available information regarding the entrepreneur includes gender, age, educational level, tenure and experience.

Women make up 15% of the entrepreneurs in our sample (54 out of 369 entrepreneurs in total). This share is considerably lower than the share of female entrepreneurs in Dutch enterprises: 30% of all Dutch entrepreneurs is female[2]. The relatively low share of female entrepreneurs in our sample may be due to the fact that female entrepreneurs tend to employ fewer employees and work fewer hours in their enterprise than male employees. Given that we only included firms with employees in our sample and that small firms are underrepresented as compared to medium-sized enterprises, this would result in a relative low share of female entrepreneurs in our sample. This explanation is consistent with the results of an exploratory probit regression, where we relate the gender of the entrepreneur to firm size and sector dummies. The results indicate a highly significant ($p<0.001$) negative relationship between firm size and the likelihood that an entrepreneur is a woman.

Characteristics of the workforce

The nature of remuneration policies is often related to basic characteristics of the workforce such as gender, age and educational level. For this study we have information about the gender, age and educational decomposition of the workforce. Summary statistics are included in Table 3. Notice that the gender of the

[1] The age variable included in Table 1 also refers to economic age.

[2] Source: 'demografische aspecten van ondernemers' (demographic aspects of entrepreneurs), a Dutch dataset available at www.entrepreneurship-sme.eu;

entrepreneur is related to the gender of the workforce: with male entrepreneurs, the majority of employees is male, while with female entrepreneurs the majority of employees is female.

Table 3 Summary statistics: characteristics of the workforce

Variable	*Mean*	*Standard deviation*	*Number of valid observations*
gender decomposition of the workforce (percentage male employees):			
Within firms with male entrepreneurs	63.5%	31.6	289
Within firms with female entrepreneurs	42.3%	34.4	45
Within all firms	60.6%	32.8	334
age decomposition of the workforce:			
share of employees <= 24	27.1%	27.4	336
share of employees 25 - 44	53.8%	27.3	336
share of elder employees >=45	19.2%	22.3	336
educational decomposition of workforce:			
share of low-educated employees	33.5%	34.3	329
share of medium-educated employees	45.1%	33.7	329
share of high-educated employees	21.4%	30.4	329

Source: EIM and ACE.

Characteristics of the best-paid employee

41 Respondents could not (or would not) identify the best-paid employee within their organisation. Consequently, these respondents could not provide any information on the remuneration of these employees. This leaves 328 observations which can be used to analyse the structure of the remuneration of the best-paid employee.

Relevant characteristics of the best-paid employee include gender, age, education, occupational level and tenure of the best-paid employee. Summary statistics are presented in Table 4 (variable means) and Table 5 (valid observations).

Table 4 Summary statistics for the best-paid employee: variable means, by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	39.2	39.8	35.3	39.8	36.9
educational level: share of best-paid employees with high education	40%	41%	30%	41%	35%
tenure of the best-paid employee (years)	6.5	6.8	4.8	7.2	4.1
occupational level: share of best-paid employees with management position	48%	51%	26%	55%	24%

Source: EIM and ACE.

Table 5 Summary statistics for the best-paid employee: variable counts (valid observations), by gender of entrepreneur and gender of best-paid employee

Variable	*All*	*By gender of entrepreneur*		*By gender of best-paid employee*	
		male	*female*	*male*	*female*
age of the best-paid employee	326	279	47	254	72
educational level: share of best-paid employees with high education	327	281	47	255	72
tenure of the best-paid employee (years)	326	280	47	254	72
occupational level: share of best-paid employees with management position	327	280	47	255	72

Source: EIM and ACE.

It is interesting to notice that the characteristics of the best-paid employee are not only related to the gender of employee, but also to the gender of the entrepreneur. To a considerable extent, this is because the gender of the entrepreneur and of the best-paid employee often coincide: for 78% of the firms in our sample, the entrepreneur and the best-paid employee are of the same gender (Table 6). In particular, the large majority of male entrepreneurs has a male best-paid employee, while for female entrepreneurs the gender of the best-paid employee is evenly distributed: 49% of the female entrepreneurs employ a female as best-paid employee; for male entrepreneurs, this is only 9%[1].

[1] Fisher's exact test rejects the hypothesis that the gender of the entrepreneur and of the best-paid employee are independent of each other at a significance level of 0.000.

Table 6 Gender of the entrepreneur and the best-paid employee

Gender entrepreneur	*Gender best-paid employee*		
	Male	*Female*	*Total*
Male	231	49	280
Female	24	23	47
Total	255	72	327

Source: EIM and ACE.

4 Results

In chapter two we formulated five different hypotheses. Our hypotheses involve three different dependent variables: the usage of performance-related pay for the best-paid employee in the firm, the usage of performance-related pay for the workforce in general and entrepreneurial income (as indicator for firm performance). The first four hypotheses will be tested separately for performance-related pay for the best-paid employee and for the workforce in general, while the fifth hypothesis will be tested on the entrepreneurial income. In this chapter we present the results of our analyses for each of these three dependent variables.

4.1 Performance-related pay for the best-paid employee

To test hypotheses H1 to H4 for the case of the best-paid employee, we estimate two equations:

- Equation 1: an equation that relates the use of performance-related pay for the best-paid employee to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the best-paid employee (including a gender dummy). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 2: as equation 1, replacing the gender dummies for the entrepreneur and the best-paid employee with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a male best-paid employee) and least likely (firms with a male entrepreneur and a female best paid employee) to apply performance-related pay for the best-paid employee. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

Ideally, we would have liked to estimate these equations separately for managerial and non-managerial employees. Our sample is, however, too small to limit our estimations to either subsample. As a second-best solution, we include a dummy for the occupational position of the best-paid employee in the equations (see e.g. Brown and Medoff, 2003).

Equations 1 and 2 have been estimated with and without sector dummies. The results indicate that including sector dummies does not change any of the relevant findings[1], while it reduces the available degrees of freedom considerably (the number of observations is limited). We therefore present the estimation results for these equations without sector dummies. These results are presented in Table 7.

[1] Estimating model 1 with sector dummies results in 1 significant sector dummy (retail) and reduces the significance of the employer characteristics somewhat; estimating model 2 with sector dummies results in 1 significant sector dummies (retail) and reduces the significance of the employer characteristics somewhat; otherwise, no differences occur.

Table 7 Probit regressions on the use of performance-related pay (profit-sharing or bonus) for the best-paid employee.

Independent Variables	*Equation 1*		*Equation 2*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.067	0.320	0.087	0.184
firm age (ln)	-0.23**	0.018	-0.22**	0.022
Employer characteristics				
age (ln)	0.85*	0.077	0.83*	0.082
experience (ln)	0.04	0.786	0.08	0.637
phd degree (dummy)	0.58**	0.014	0.63***	0.008
Female entrepreneur(dummy)	-0.15	0.545	-	
Characteristics best-paid employee				
age (ln)	-0.26	0.505	-0.23	0.555
tenure (ln)	0.38***	0.001	0.37***	0.001
Medium education (dummy)	0.24	0.386	0.22	0.43
high education (dummy)	0.76***	0.009	0.73**	0.012
Female employee (dummy)	-0.10	0.657	-	
Management position (dummy)	0.52	0.147	0.53	0.141
Gender comparison employer/employee				
female entrepreneur, male employee (dummy)	-		0.11	0.723
male entrepreneur, female employee (dummy)	-		0.08	0.728
Constant	-3.44*	0.065	-3.65**	0.048
Goodness of Fit Measures				
Pseudo R^2	0.1482		0.1471	
Log likelihood	-172.1		-172.3	
Valid Observations	307		307	

; **; * Denote a significance level of 10%, 5% and 1%, respectively.*

The results for both equations are very similar: the likelihood that a firm applies performance-related pay for its best-paid employee is higher for younger firms, for firms with elder and highly educated entrepreneurs, and for employees with high tenure and a high educational level. There is no indication that firm size is relevant. More important, there is also no indication of any gender effect: concerning the remuneration of the best-paid employee, we find no support for hypotheses H1 to H4. Specifically, the results of equation 1 reject hypotheses H1 and H2: neither the gender of the entrepreneur nor the gender of the best-paid employee are related to the probability that the best-paid employee receives performance-related pay. Likewise, the results of equation 2 reject hypotheses H3 and H4. This follows from the insignificance of the dummies indicating the

firms that are most and least likely to apply performance-related pay for the best-paid employee.

4.2 Performance-related pay for the workforce in general

Regarding the workforce in general, we use a similar approach to test hypotheses H1 to H4. Again, two equations are estimated:

- Equation 3: an equation that relates the use of performance-related pay for some or all of the employees to firm characteristics, entrepreneurial characteristics (including a gender dummy) and characteristics of the workforce as a whole (including the share of male employees). This will be estimated by a probit regression. The results will be used to test hypotheses H1 and H2;
- Equation 4: as equation 3, replacing the entrepreneurial gender dummy and the share of male employees with two dummies that indicate the enterprises that are assumed to be most likely (firms with a female entrepreneur and a relatively high share of male employees) and least likely (firms with a male entrepreneur and a relatively high share of female employees) to apply performance-related pay to the workforce in general. This will be estimated by a probit regression. The results will be used to test hypotheses H3 and H4.

The estimation of equation 4 requires that we classify enterprises into three categories, based on the gender of the entrepreneur and whether the share of (fe)male employees is relatively high or low. The second criterion can be operationalised in different ways. A straightforward approach is to determine various percentiles of the distribution of the share of male employees, and consider the lowest/highest percentiles as those with relatively low/high shares of male employees. The question then remains, how many percentiles to distinguish. An increase in the number of percentiles may increase the differences between the lowest and highest percentiles (thus increasing the likelihood of finding statistically significant differences), but also decreases the number of observations within the percentiles (thus decreasing the likelihood of finding statistically significant differences). Since this is an explorative study, we have estimated equation 4 based on the outcomes of using two, three and four percentiles. In this paper, we report the outcomes with the highest significance levels for the variables of interest.

As it turns out, distinguishing four percentiles provided the highest significance levels for the two dummy variables indicating enterprises that are most/least likely to apply performance-related pay. In this situation, a 'low share' of male employees refers to the 25% enterprises with the lowest shares of male employees (less than 37%), and a 'high share' refers to the 24% enterprises with the highest share of male employees (92.5% or more). Combined with the gender of the entrepreneur, this results in a group of 61 enterprises for which performance-related pay is least likely to occur (a male entrepreneur and a low share of male employees) and a group of only 6 enterprises for which performance-related pay is most likely to occur (a female entrepreneur and a high share of male employees).

The results are presented in Table 8, again without including sector dummies.

Table 8 Probit regressions on presence of performance-related pay for some or all employees in the workforce.

Independent Variables	*Equation 3*		*Equation 4*	
	Parameter value	*Sign. level*	*Parameter value*	*Sign. level*
Firm characteristics				
firm size (ln)	0.29***	0.068	0.31***	0.000
firm age (ln)	-0.05	0.571	-0.04	0.623
Employer characteristics				
age (ln)	0.82*	0.087	0.81*	0.092
experience (ln)	-0.14	0.384	-0.10	0.503
phd degree (dummy)	0.09	0.665	0.14	0.497
Female entrepreneur (dummy)	-0.09	0.703	-	
Workforce characteristics				
share of highly educated employees	0.0089***	0.001	0.0087***	0.001
share of elder employees	-0.0097**	0.019	-0.0085**	0.034
share of male employees	0.005**	0.033	-	
Gender comparison employer/workforce				
female entrepreneur, low share female employees (dummy)	-		1.02*	0.065
male entrepreneur, high share female employees (dummy)	-		-0.29	0.136
constant	-3.78**	0.015	-3.9**	0.013
Goodness of Fit Measures				
Pseudo R^2	0.1072		0.1102	
Log likelihood	-187.0		-186.3	
Valid Observations	321		321	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 3 and 4 are very similar: the likelihood that a firm applies performance-related pay for some (or all) of its employees is higher for larger firms, and for firms with a higher share of young and highly educated employees. Notice that these results are different from the results for equations 1 and 2: instead of firm age, it is firm size that matters now, and employer characteristics no longer seem to be very important.

Equations 3 and 4 still find no support for hypotheses H2 and H4. The lack of support for hypothesis H2 contradicts the earlier findings by Roepers and De Kok, who found that female entrepreneurs are (ceteris paribus) more likely to provide performance-related pay than male entrepreneurs (Roepers and De Kok, 2007, page 31). Their study, however, included less control variables. In particular, they did not control for the educational level of the entrepreneur and the age and education of the workforce. Once these control variables are included in the model, the significant effect of the gender of the entrepreneur disappears.

The positive parameter for the share of male employees in equation 3 supports hypothesis H1. In addition, the positive dummy variable that indicates firms with a female entrepreneur and a low share of female employees offers some support for hypothesis H3 (although it should be noted that this parameter is only significant at 10%[1]). This is consistent with the results by Roepers and De Kok, who found a significant positive effect of the interaction between the gender of the entrepreneur and the share of male employees (Roepers and De Kok, 2007, page 31).

4.3 Gender, performance-related pay and firm performance

4.3.1 Controlling for workforce characteristics

To test the final hypothesis, we estimate various equations with the log of the entrepreneurial income as dependent variable.

- Equation 5: the starting point is an equation that relates the (log of the) income level of the entrepreneur to several firm characteristics, entrepreneurial characteristics and workforce characteristics;
- Equation 6: as equation 5, including a dummy variable indicating the use of performance-related pay for at least some employees;
- Equation 7: as equation 5, including a dummy variable indicating a consistent pay policy: this is either a combination of performance-related pay and a high share of male employees, or a combination of no performance-related pay and a high share of female employees.

Estimating equation 7 requires that we identify firms with a consistent pay policy. This, in turn, requires that we identify firms with a relatively high share of (fe)male employees. We use the same method as discussed in the previous section, which is based on the percentiles of the distribution of the share of male employees. As is the case with equation 4, we find the best results when we use four different percentiles. In this case, 93 firms in the sample have a consistent pay policy (66 firms with relatively few male employees without performance-related pay and 27 firms with relatively many male employees with performance-related pay). The estimation results are reported in Table 9.

According to the results for equations 5, 6 and 7, entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees. Neither the gender of the entrepreneur nor the gender composition of the workforce are significantly related to entrepreneurial income. There is also no support for hypothesis H5: while the prevalence of performance-related pay in general is associated with a higher entrepreneurial income (equation 6), our indicator for a consistent pay policy is not (equation 7). Apparently, the effect of performance-related pay on entrepreneurial income does not de-

[1] In addition, if sector dummies are included, the significance of this parameter becomes less than 10%.

pend on the gender composition of the workforce; at least not in the way that we hypothesised[1].

Table 9 OLS Regression results on log entrepreneurial income (robust estimators)

	Equation 5		*Equation 6*		*Equation 7*	
Independent Variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.25***	0.000	0.24***	0.000	0.26***	0.000
firm age (ln)	-0.008	0.875	0.022	0.664	-0.009	0.860
employer characteristics						
age (ln)	0.43	0.261	0.32	0.417	0.54	0.167
experience (ln)	0.12	0.337	0.15	0.249	0.08	0.505
phd degree (dummy)	0.34**	0.014	0.31**	0.024	0.31**	0.027
Female entrepreneur (dummy)	-0.31	0.214	-0.27	0.233	-0.22	0.313
Workforce characteristics						
share of highly educated employees	0.006***	0.006	0.006***	0.008	0.006***	0.008
share of elder employees	-0.003	0.360	-0.002	0.452	-0.003	0.380
share of male employees	-0.000	0.858	-0.001	0.753	-0.003	0.380
Performance-related pay for some or all employees	-		0.29***	0.009	-	
consistent pay policy	-		-		-0.23	0.137
Constant	1.38	0.231	1.54	0.192	1.11	0.345
Goodness of Fit Measures						
R^2	0.37		0.41			
Valid Observations	128		128		128	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

4.3.2 Controlling for characteristics of the best-paid employee

In the previous section, we examined to which extent characteristics of (performance-related pay for) the workforce could explain entrepreneurial income. In this section, we focus on characteristics of (performance-related pay for) the best-paid employee. This is done by including characteristics of the best-paid employee in equations 5 to 7, and replacing the indicators for performance-related pay for the workforce with comparable indicators for performance-related pay for the best-paid employee. This results in equations 8, 9 and 10 (see Table 10).

[1] Hypothesis H5 implies that for firms with a high share of male employees, performance-related pay would have a positive effect on entrepreneurial income; for firms with a low share of male employees, performance-related pay would have a negative effect on entrepreneurial income.

In equation 10, the dummy variable indicating consistent pay policy refers to 11 firms with a female best-paid employee that receives no performance-related pay, and 47 firms with a male best-paid employee that receives performance-related pay.

Table 10 Regression results on firm performance (log entrepreneurial income (OLS, robust estimators), including characteristics best-paid employee

	Equation 8		*Equation 9*		*Equation 10*	
Independent variables	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*	*Parameter value*	*Sign. level*
firm characteristics						
firm size (ln)	0.28***	0.000	0.27***	0.000	0.27***	0.000
firm age (ln)	-0.02	0.734	-0.02	0.736	0.002	0.975
employer characteristics						
age (ln)	0.054	0.903	0.03	0.944	0.056	0.895
experience (ln)	0.24*	0.084	0.24*	0.094	0.20	0.113
phd degree (dummy)	0.27*	0.052	0.22	0.147	0.29*	0.059
Female entrepreneur (dummy)	-0.28	0.292	-0.29	0.246	-0.21	0.414
Workforce characteristics						
share of highly educated employees	0.007***	0.002	0.006**	0.012	0.008***	0.001
share of elder employees	-0.005	0.192	-0.004	0.274	-0.005	0.187
share of male employees	0.002	0.318	0.002	0.378	0.000	0.908
Characteristics best-paid employee						
Female employee (dummy)	0.30	0.166	0.29	0.185	-	
performance-related pay	-		0.15	0.268	-	
consistent pay policy	-		-		-0.13	0.267
Constant	2.38*	0.083	2.44*	0.086		
Goodness of Fit Measures						
R^2	0.3769		0.3859			
Valid Observations	117		117		117	

; **; * denote a significance level of 10%, 5% and 1%, respectively.*

The results for equations 8, 9 and 10 are similar to the results for equations 5, 6 and 7: entrepreneurial income increases with firm size and with the educational level of the entrepreneur as well as the employees (although the effect of the educational level of the entrepreneur is somewhat lower). None of the included gender variables have a significant effect (gender of the entrepreneur, gender composition of the workforce and gender of the best-paid employee). Also here, there is no support for hypothesis H5: our indicator for a consistent pay policy is not only not significant, but even has the wrong sign (equation 10).

5 Discussion and conclusions

In this study we have derived five different hypotheses concerning the gender effects in performance-related pay amongst small and medium-sized effects. These hypotheses are based on two basic assumptions: the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion, and risk aversion is gender-related. The empirical support for our hypotheses is, however, very limited. In this chapter we discuss the estimation results and end with the main conclusions.

5.1 Discussion

Partial support for the first hypothesis…

According to the first hypothesis, performance-related pay would be used less for female employees than for male employees. We find empirical support for this hypothesis, but only regarding the workforce in general: firms with a larger share of male employees are more likely to offer performance-related pay to their employees.

When we analyse the remuneration of the best-paid employee, we find no relationship between the employee's gender and the probability that he or she received a share of the profit or a bonus. One explanation for this lack of support is that the sample size is not large enough; our data set only contains 72 observations where the best-paid employee is female.

…and no support for the second hypothesis…

The second hypothesis states that female entrepreneurs are more likely to use performance-related pay than male entrepreneurs. There is no support for this hypothesis. The results presented by Roepers and De Kok (2007) seem to support this hypothesis, but additional analysis has shown that this support is the result of a missing variable bias: once additional control variables are added to the model by Roepers and De Kok (2007), the effect of the gender of the entrepreneur is no longer significant.

…so no support for the third and fourth hypothesis should be expected

Hypotheses H3 and H4 are only valid if the first two hypotheses are. If one of the first two hypotheses would not be valid, then hypotheses H3 and H4 should also be rejected. At a 5% confidence level, this is indeed the case. The fact that we find no support for hypotheses H3 and H4 is thus consistent with the lack of support for the second hypothesis.

No support for the fifth hypothesis regarding entrepreneurial income

The results of the first four hypotheses are consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. If this is the case, we expected to find support for hypothesis H5: The income of the entrepreneur is higher when we observe pay policies consistent with efficient risk

sharing. We find, however, no support for this hypothesis. Also here, this could be due to the limited number of observations (128 or 117 valid observations).

Do we need more data…

One interpretation of the results of our study, is that the results are largely consistent with the standard assumption that firms are risk neutral while individual employees are risk averse. The support is not strong, but this could be explained by the relatively limited number of observations. According to this interpretation, the main finding of our study is then that we find no support for the expected relationship between the gender of the entrepreneur and the incidence of performance-related pay. The small size of our sample, however, does not allow for strong conclusions.

…or do we need an alternative theory?

Another interpretation of the results is also possible. The empirical support for our hypotheses is so limited, that we should reconsider the two basic assumptions that underlie our hypotheses.

The first assumption is that the willingness of employers and employees to accept performance-related pay depends (amongst others) on their levels of risk aversion. This assumption ignores the difference between risk aversion and ambiguity aversion (Borghans et al., 2009; Machina, 2009). Individuals often find themselves in situations where different outcomes may occur. The probabilities of these outcomes may either be known or unknown. Risk aversion refers to an individual's behaviour in case of know probabilities, while ambiguity aversion refers to an individual's behaviour in case of unknown probabilities. Since the distribution of the expected performance of employees is not known in advance, the incidence of performance-related pay is likely to be related to the ambiguity aversion of the employer and employees, rather than their risk aversion.

Borghans et al. (2009) found that risk aversion and ambiguity aversion are empirically distinct individual traits. Regarding risk aversion, they find that women are more risk averse than men, and that psychological traits are strongly associated with risk aversion. Regarding ambiguity aversion, however, they find markedly different results. Men and women show similar marginal valuations of ambiguity (with increasing levels of ambiguity), and ambiguity aversion is not related to psychological traits. If ambiguity diversion is indeed not gender-related, the second basic assumption of our study (risk aversion is gender-related) would not apply in the case of ambiguity aversion.

According to this line of argument, differences in risk aversion between men and women cannot explain gender differences in the incidence of performance-related pay. An alternative explanation for gender differences in the incidence of performance-related pay is that they are partly caused by gender differences in labour force attachment. Various authors have argued that differences in labour force attachment between men and women could explain part of the gender earnings gap (Kunze, 2005; Nordman and Roubaud, 2005). According to Geddes and Heywood (2003), gender differences in labour force attachment may also explain differences in the incidence of performance-related pay: on average, women have a lower labour force attachment than men, which is in turn related to the probability of receiving performance-based pay.

5.2 Conclusions

We have found partial support for the first hypothesis, which states that female employees are less likely to receive performance-related pay than male employees. There is also some support for the third hypothesis, which states that performance-related pay is most likely to occur in firms with a female entrepreneur and a high share of male employees. This support is however weak: it is only significant at a 10% confidence level, and is furthermore based on the comparison of a sample of only 6 firms (with a female entrepreneur and a high share of male employees) with the other firms. For the other three hypotheses, there is no empirical support.

One interpretation of the results is that they indicate that entrepreneurs are risk neutral while employees are risk averse (where female employees are more risk averse than male employees). Due to the small sample size, however, this interpretation is only tentative. Additional empirical research on considerable larger dataset is required. Perhaps future studies can make use of administrative data (e.g. of payrolling companies that target SMEs).

Another interpretation is that the lack of support for our hypotheses suggests that we need to reconsider them, including the basic assumptions on which they are based. In our study, we have used gender as a proxy for the risk aversion of individual entrepreneurs and employees, and assumed that risk aversion (of employers as well as employees) is in turn related to the incidence of performance-related pay. However, it can be argued that this assumption is not correct: the incidence of performance-related pay may be related to ambiguity aversion rather than risk aversion. Gender may however also serve as a proxy for differences in labour force attachment. Differences in labour force attachment are likely to be only relevant for employers, not for employees, which seems consistent with our lack of empirical support for the presence of an entrepreneurial gender effect.

For a better understanding of gender effects in remuneration policies, future studies should further develop the relationships between performance-related pay, risk aversion and ambiguity aversion and labour force attachment, both theoretically and empirically.

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